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INTRADERMIC TUBERCULIN TESTING IN CATTLE.

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WE have carried out many tests in cattle, using concentrated tuberculin intradermically, and some of the points investigated have already been published.

Two herds of milch cows have been under our observation for the past three years, and, using the double intradermic tuberculin test twice a year, we have succeeded in separating reactors from non-reactors and in keeping the non-reactor sections tubercle free. Farm A had 103 milk cows and heifers, and, when tested in 1925, sixty-seven reacted positively and thirty-six gave a negative result. From the non-reacting cows, six were chosen for the supplying of milk for calf-rearing and removed to a special calf-rearing farm; thirty-one of the best cows were removed to a new farm. These cattle have been tested twice annually for the last two and a half years and those remaining in the herds are still non-reactors. It has been necessary to add to these herds: double intradermic testing has always been carried out on these additions before their admission to the herds.

Farm B had ninety-six milk cows and heifers. Three years ago, application of the double intradermic test showed that fifty-eight were affected with tuberculosis.

The thirty-eight non-reactors were dealt with as on Farm A, except that for one and a half years they were kept on the same farm as the reactors but in separate sheds. An occasional reactor was detected in subsequent tests, but one and a half years ago the owner took over a new farm to which the non-reacting cattle were sent: since that time no further reactors have been noted. Additions to the herd are dealt with as on Farm A. Subcutaneous tests have also been done on two occasions and the results agree with the double intradermic tests.

Calf-rearing on these two farms has been under our observation for three years. The farmer, unfortunately, insists that the calves suck their dams once; they are then removed to the farms on which the non-reacting cattle are kept and are fed on milk from these cows. Intradermic tuberculin tests have been carried out on these calves at regular intervals, and of over 100 calves so reared only two have shown reactions, while the majority of control calves kept on the original farms and fed on milk from the reacting cows have reacted at some stage in their lives to the tuberculin tests. It is then evident that the double intradermic test is a satisfactory test to employ in the cleaning up of a herd and in the testing of cows supplying milk for the feeding of calves on a presumably clean farm.

In addition to the cleaning up of herds, we have studied the reactions produced by the double intradermic method of testing on other cattle, and it may be of interest to note the following:—

(a) *Standardization of Tuberculin.*—The tuberculin used for the tests has been standardized by the intradermic guinea-pig method, and we are convinced that a tuberculin so standardized and passed as equal to the Frankfurt standard, is an efficient preparation for intradermic use in cattle.

Tuberculous cattle will not show the same degree or type of reaction in every case with the same tuberculin, in fact similar amounts of the same tuberculin, injected into different parts of the skin of the same animal, produce different

reactions, but experience in reading reactions will cause one to classify different degrees and types of reaction as positive.

(b) *Strength of Tuberculin.*—While most of our tests have been made with tuberculin equal in potency to the Frankfurt standard, lately we have used tuberculin of double and even quadruple strength. In our experience, a cleaner cut reaction is obtained by such a preparation. We have had the feeling that a strong tuberculin, while giving clearer positive reactions, produced some degree of non-specific reaction even in non-reacting cattle, and that the more marked reaction in tuberculous cattle was due to this non-specific reaction. Our numerous tests, however, convince us that, allowing for an increase in non-specific reaction, a strong tuberculin gives a more definite and more easily read positive reaction than one of standard potency. In all our experience there have been only four cattle in which a very marked degree of difference in reaction has occurred when a standard and a fourfold strong tuberculin were used, and it is very probable that, using tuberculin equal to standard, these cows would have been passed as non-reactors. We believe that the benefit derived from the use of this strong tuberculin is that there will be fewer indefinite reactions recorded. Indefinite reactions do occur and some cattle will continue to show such indefinite reactions at all tests, no matter how often applied. With the use of strong tuberculin these indefinite reactions are reduced in number but are still observed. It may be that when purified tuberculin has been thoroughly worked out and is available for general work, the "indefinite reaction" will be further reduced or will disappear entirely.

(c) *Comparison of Subcutaneous and Intradermic Tests.*—We have tested many cows and heifers by both methods, usually leaving an interval of about one month between the two tests, and as a rule the results are in very close agreement. We have, however, records of the testing of cattle in which exactly opposite results have been recorded. In one cow only have we observed that positive reactions were obtained by the use of tuberculin subcutaneously, while the intradermic tests were negative. This cow was tested on many occasions and never once did she react to the intradermic tests, while on every occasion a typical temperature chart followed the use of diluted tuberculin subcutaneously. This cow died, and post-mortem examination showed advanced generalized tuberculosis, which was confirmed by guinea-pig inoculation.

In five cows only are we able to record the reverse, viz., they reacted to the intradermic test while subcutaneous tuberculin gave no reaction. These cows were tested intradermically and a month later received a dose of tuberculin subcutaneously. They reacted typically to the first test but gave an entirely negative reaction to the second test. In six months' time they were again tested by both methods, one month elapsing between the tests, and the results were as before. These cows are now isolated and will be subjected to further testing in the near future. It should be noted that a double dose of tuberculin was used for the subcutaneous test and temperatures were taken every three hours after injection.

Cases of similar results are recorded in the literature, but after a series of over 300 tests by both methods these five cows are the only ones which in our hands have yielded such results.

The conclusion one would draw from the large series of tests we have carried out is that the double intradermic method of tuberculin testing is reliable and the amount of error is probably somewhat smaller than when the subcutaneous method is used.